TO KEEP EVERY COG AND WHEEL: PRESERVING BIODIVERSITY THROUGH THE ENDANGERED SPECIES ACT'S PROTECTION OF ECOSYSTEMS

MATTHEW D. BOCKEY[*]

I. INTRODUCTION

It has been called the Lord God Bird[1] and described as "the avian equivalent of a tuxedoed aristocrat."[2] Alexander Wilson, "the father of American ornithology,"[3] once elevated it to a noble status.[4] Wilson described the bird as "the sole lord" of its native habitat,[5] and as "hav[ing] a dignity . . . superior to the common herd of woodpeckers."[6] With a nearly thirty-one-inch wingspan, the ivory-billed woodpecker was the largest woodpecker in North America.[7] Due to its large size and "spectacularly patterned" plumage, the ivory-bill was much sought after by birders.[8]

Ivory-billed woodpeckers historically lived in old-growth forests of the southeastern United States and Cuba.[9] The ivory-billed woodpecker was never a very common bird.[10] However, by the middle of the twentieth century, following decades of habitat destruction,[11] the ivory-billed woodpecker had become the "Holy Grail" of North American birders.[12]

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[1] Mel White, *The Ghost Bird*, NAT'L GEOGRAPHIC, Dec. 2006, at 143.

[2] JEROME A. JACKSON, IN SEARCH OF THE IVORY-BILLED WOODPECKER 2 (2006).

[3] *Id.* at 44.

[4] EDWARD O. WILSON, THE FUTURE OF LIFE 104 (2002).

[5] JACKSON, *supra* note 2, at 44.

[6] WILSON, *supra* note 4, at 104.

[7] JACKSON, *supra* note 2, at 2.

[8] *Id.*

[9] *The Search for the Ivory-Billed Woodpecker: Ecology and Behavior*, CORNELL LAB ORNITHOLOGY, http://www.birds.cornell.edu/ivory/aboutibwo/life_ivorybill_html (last visited Sept. 11, 2012).

[10] JACKSON, *supra* note 2, at 2.

[11] WILSON, *supra* note 4, at 104.

[12] JACKSON, *supra* note 2, at 1.

Despite numerous efforts, the last confirmed sighting of this spectacular creature occurred in 1944.[13] Today, all that remains are some 400 specimens contained in scientific collections.[14] The noble ivory-billed woodpecker was driven to extinction after its habitat was destroyed for human development.[15]

Historically, the ivory-billed woodpecker never occurred in high concentrations;[16] however, humans have driven to extinction species that once were very numerous.[17] The passenger pigeon was once likely the most abundant bird on the planet.[18] In the early nineteenth century, at least one of every four birds in North America was a passenger pigeon.[19] John James Audubon once witnessed a massive flock that took three whole days to pass overhead.[20] Despite these massive numbers, the passenger pigeon succumbed to overhunting and habitat loss.[21] The last known passenger pigeon died in captivity in 1914.[22]

Unfortunately, extinction is not only a thing of the past.[23] Humans still cause extinctions at alarming rates today, and it is commonly accepted that we are in the early stages of the earth's sixth great extinction event.[24] Scientists estimate that extinctions are occurring somewhere between 1,000 and 10,000 times the rate before humans began exerting significant environmental pressure.[25] These extinctions affect all types of life,

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[13] White, *supra* note 1, at 143.

[14] JACKSON, *supra* note 2, at 74.

[15] WILSON, *supra* note 4, at 104. Credible reports surfaced in 2005 that the ivory-billed woodpecker had been rediscovered. White, *supra* note 1, at 147. However, subsequent searches found no birds, and today the species is commonly believed to be extinct. *See generally id.* at 143–57.

[16] JACKSON, *supra* note 2, at 2.

[17] *See* Paul R. Ehrlich, David S. Dobkin, & Darryl Wheye, *The Passenger Pigeon*, STAN. UNIV. (1988), http://www.stanford.edu/group/stanfordbirds/SUFRAME.html.

[18] *Id.*

[19] CHARLES C. MANN, 1491: NEW REVELATIONS OF THE AMERICAS BEFORE COLUMBUS 365 (2d ed. 2011).

[20] *Id.* at 364.

[21] *See id.* at 365.

[22] *Id.* Following the passenger pigeon's demise, famed conservationist Aldo Leopold dedicated a monument to the pigeon near its greatest recorded nesting site where 1.5 million birds were slaughtered. *Id.* A plaque on the monument reads: "This species became extinct through the avarice and thoughtlessness of man." *Id.*

[23] MITCH TOBIN, ENDANGERED: BIODIVERSITY ON THE BRINK 1 (2010).

[24] *Id.*

[25] WILSON, *supra* note 4, at 98–99.

including fishes, amphibians, insects, mammals, and plants.[26] Every year, approximately one of every hundred plant and animal species goes extinct.[27] This converts to an average of three species per hour.[28] At this rate, 15%–30% of all wild species may go extinct within a single human generation.[29]

In an attempt to counter the extinction crisis, Congress passed the Endangered Species Act (ESA) in 1973.[30] The ESA has had a polarizing effect on the American public.[31] Some have lauded the ESA as "the world's toughest environmental law."[32] Others have criticized it for interfering with private property rights.[33] Opposition to the ESA took a serious turn in the mid-1990s. Following the Supreme Court's landmark decisions in *United States v. Lopez*[34] and *United States v. Morrison*,[35] opponents began mounting Commerce Clause challenges to the ESA.[36] Challengers argued that the ESA was unconstitutional as applied to purely intrastate species with no known commercial value.[37] To date, six cases have reached federal courts of appeal.[38] Though none of these challenges have been successful, the circuit courts of appeal have been unable to agree on a single rationale for upholding the ESA.[39]

Given this confusion, this Comment enunciates a single rationale by which the ESA can withstand Commerce Clause challenges. Part II briefly examines the ESA and the Supreme Court's Commerce Clause jurisprudence prior to *Lopez* and *Morrison*. It then examines *Lopez* and *Morrison*, as well as the ESA challenges decided under the *Lopez* and *Morrison* framework. Part III considers the Supreme Court's decision in

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[26] *Id.* at 98. *See also* TOBIN, *supra* note 23, at 35.

[27] JOE ROMAN, LISTED: DISPATCHES FROM AMERICA'S ENDANGERED SPECIES ACT 35 (2011).

[28] TOBIN, *supra* note 23, at 1.

[29] ROMAN, *supra* note 27, at 35.

[30] 16 U.S.C. §§ 1531–1544 (2006).

[31] TOBIN, *supra* note 23, at 3.

[32] *Id.*

[33] *See* ROMAN, *supra* note 27, at 1.

[34] 514 U.S. 549 (1995).

[35] 529 U.S. 598 (2000).

[36] *See, e.g.*, Rancho Viejo, LLC v. Norton, 323 F.3d 1062 (D.C. Cir. 2003).

[37] *See, e.g.*, *id.* at 1071.

[38] *See* discussion *infra* Parts II.C, III.B.

[39] *See* discussion *infra* Part II.D.

Gonzales v. Raich[40] and the ESA challenges subsequent to that decision. Part IV advocates for a different approach to these cases, the "ecosystem approach." It then explains how the ESA can withstand Commerce Clause challenges when analyzed under the ecosystem approach.

II. BACKGROUND INFORMATION

A. The Endangered Species Act: An Overview

Chief Justice Burger called the ESA "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation."[41] Congress adopted the ESA after it found that numerous species had been driven to extinction because of human development.[42] Additionally, Congress found that other species may be at risk of extinction,[43] and these species possessed "esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people."[44] Congress enacted the ESA "to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved . . . ."[45] In adopting the ESA, Congress declared it federal policy to both conserve endangered species and to slow the trend toward extinction.[46] This policy was to be pursued "whatever the cost."[47]

The ESA assigns specific duties to the Secretary.[48] The Secretary is required to determine whether any species is "endangered" or "threatened" and to designate critical habitat for such species.[49] The Act requires all federal agencies, in consultation with the Secretary, to carry out programs for the conservation of endangered and threatened species.[50] These

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[40] 545 U.S. 1 (2005).

[41] Tenn. Valley Auth. v. Hill, 437 U.S. 153, 180 (1978).

[42] 16 U.S.C. § 1531(a) (2006).

[43] *Id.*

[44] *Id.* § 1531(a)(3).

[45] *Id.* § 1531(b).

[46] *Id.* § 1531(c).

[47] Tenn. Valley Auth. v. Hill, 437 U.S. 153, 184 (1978).

[48] The term "Secretary" means either the Secretary of the Interior or the Secretary of Commerce. 16 U.S.C. § 1532(15). The Secretary of the Interior oversees terrestrial and freshwater species, while the Secretary of Commerce oversees marine species. ROBERT V. PERCIVAL ET AL., ENVIRONMENTAL REGULATION: LAW, SCIENCE, AND POLICY 940 (6th ed. 2009).

[49] 16 U.S.C. § 1533(a).

[50] *Id.* § 1536(a)(1).

agencies must insure that any "agency action"[51] is "not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification" of such species' critical habitat.[52] If the Secretary concludes, after consultation, that the proposed action will likely jeopardize the species, then the Secretary may suggest "reasonable and prudent alternatives" that the Secretary believes will not result in violations of the ESA.[53]

The ESA prohibits the sale, import, export, or transport of any species that is listed as endangered.[54] The same provision also makes it unlawful for any person to "take" any wildlife or fish that are listed.[55] "The term 'take' means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."[56] This take prohibition is "the statute's most controversial provision because it can impose restrictions on private property."[57] As such, the take provision has been the subject of several constitutional challenges where the listed species resides exclusively in one state.[58]

B. A Brief History of the Commerce Clause

The Commerce Clause provides that "Congress shall have Power . . . [t]o regulate Commerce . . . among the several States."[59] It has been cited as the source of authority for a broad range of federal legislation.[60] Throughout American history, the Supreme Court has

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[51] The term "agency action" is defined as "any action authorized, funded, or carried out" by a Federal agency. *Id.* § 1536(a)(2).

[52] *Id.*

[53] *Id.* § 1536(b)(3)(A).

[54] *Id.* § 1538(a)(1)(A).

[55] *Id.* § 1538(a)(1)(B)–(C).

[56] 16 U.S.C. § 1532(19).

[57] Michael C. Blumm & George Kimbrell, *Flies, Spiders, Toads, Wolves, and the Constitutionality of the Endangered Species Act's Take Provision*, 34 ENVTL. L. 309, 309 (2004). Though the ESA does not identify a source of congressional authority, it seems clear that the Commerce Clause serves as that source. Philip Weinberg, *Endangered Statute? The Current Assault on the Endangered Species Act*, 17 VILL. ENVTL. L.J. 389, 394 (2006).

[58] *See, e.g.*, San Luis & Delta-Mendota Water Auth. v. Salazar, 638 F.3d 1163, 1168 (9th Cir. 2011); Alabama-Tombigbee Rivers Coal. v. Kempthorne, 477 F.3d 1250, 1271 (11th Cir. 2007).

[59] U.S. CONST. art. I, § 8, cl. 3.

[60] ERWIN CHEMERINSKY, CONSTITUTIONAL LAW: PRINCIPLES AND POLICIES 242 (3d ed. 2006).

provided various interpretations of the Commerce Clause and the extent of Congress's powers under the clause.[61] Initially, the Supreme Court adopted an expansive view of the Commerce Clause's scope.[62] Beginning in the late nineteenth century and continuing until 1937, the Court adopted a more narrow interpretation of the Commerce Clause.[63] During this period, the Court struck down numerous federal laws for exceeding Congress's commerce authority.[64] In 1937, the Court returned to an expansive view of the Commerce Clause.[65] Following the Court's transition in 1937, not one federal law was found to exceed the scope of Congress's Commerce Clause power for nearly sixty years.[66] However, "[t]he world changed abruptly in 1995" when the Court again adopted a more narrow interpretation of the Commerce Clause.[67] In *United States v. Lopez*,[68] the Supreme Court struck down the Gun-Free School Zones Act.[69] Five years later, in *United States v. Morrison*,[70] the Court declared unconstitutional a provision of the Violence Against Women Act.[71]

C. The Commerce Clause Under Lopez and Morrison

In *Lopez*, the Supreme Court considered the constitutionality of the Gun-Free School Zones Act (GFSZA).[72] The GFSZA made it a federal

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[61] *Id.*

[62] *Id.* at 242–43. In *Gibbons v. Ogden*, 22 U.S. (9 Wheat.) 1 (1824), the Court struck down a New York statute that granted an exclusive monopoly to operate steamboats in New York waters. The Court broadly interpreted the term "commerce" to include "commercial intercourse between nations, and parts of nations, in all its branches." *Id.* at 189–90. Further, the Court interpreted the term "among the several States" to mean "intermingled with." *Id.* at 194.

[63] CHEMERINSKY, *supra* note 60, at 243.

[64] *Id.* For example, in *Hammer v. Dagenhart*, 247 U.S. 251, 276 (1918), the Court held that Congress had no authority to enact child labor laws because the regulation of production was entrusted "purely [to] state authority."

[65] CHEMERINSKY, *supra* note 60, at 243. For example, in *NLRB v. Jones & Laughlin Steel Corp.*, the Court upheld federal regulation of the steel industry despite the fact that it regulated production. 301 U.S. 1, 49 (1937).

[66] CHEMERINSKY, *supra* note 60, at 243.

[67] Blumm & Kimbrell, *supra* note 57, at 317.

[68] 514 U.S. 549 (1995).

[69] *Id.* at 551.

[70] 529 U.S. 598 (2000).

[71] *Id.* at 601.

[72] *Id.* at 551.

offense to possess a gun within a school zone.[73] The Court held that the GFSZA exceeded Congress's authority under the Commerce Clause.[74] The Court first determined that the GFSZA would be upheld only if it was an "activit[y] having a substantial relation to interstate commerce . . . *i.e.*, [an] activit[y] that substantially affect[s] interstate commerce."[75]

To assist in determining whether the GFSZA substantially affected interstate commerce, the Court considered four factors.[76] First, the Court considered whether the regulated activity had anything to do with commerce or some sort of economic activity.[77] The Court stated that the GFSZA was a criminal statute that had "nothing to do with 'commerce' or any sort of economic enterprise, however broadly one might define those terms."[78] Additionally, the prohibition was not an essential part of a larger economic regulatory scheme.[79]

The second factor the Court considered was whether the GFSZA contained a "jurisdictional element."[80] Such a jurisdictional element would expressly limit the statute's reach to only those firearms that had an "explicit connection with or effect on interstate commerce."[81] However, the GFSZA did not contain such a limitation, and accordingly, this factor weighed against the statute's validity.[82]

Third, the Court considered whether there were congressional findings or legislative history detailing the effect on interstate commerce.[83] Though such findings were not required, their existence could help the Court evaluate the act, particularly where a commercial effect was not "visible to

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[73] *Id.*

[74] *Id.*

[75] *Id.* at 558–59. Congress's commerce authority extends to two other categories: (1) the use of the channels of interstate commerce and (2) the instrumentalities of interstate commerce, or persons or things in interstate commerce, even though the threat comes only from intrastate activities. *Id.* at 558. The Court, however, quickly disposed of these categories as bases for upholding the GFSZA. *Id.* at 559.

[76] *See id.* at 561–63.

[77] *Id.* at 561.

[78] *Id.*

[79] *Id.*

[80] *Id.*

[81] *Id.* at 562.

[82] *Id.*

[83] *Id.*

the naked eye."[84] However, the GFSZA contained no legislative history or findings linking gun possession in a school zone to interstate commerce.[85]

Fourth, the Court considered whether the relationship between the regulated activity and interstate commerce was too tenuous.[86] The Government essentially argued that the possession of a gun in a school affected the national economy in two ways: First, the substantial costs associated with violent crime would be spread throughout the population through insurance.[87] Second, the Government claimed that individuals would be less willing to travel to areas within the country that are deemed dangerous.[88] Additionally, the Government argued that the presence of guns in schools threatened the learning environment.[89] This would result in a less productive citizenry and ultimately would affect interstate commerce.[90] However, the Court rejected all of these arguments.[91] The Court stressed that under the Government's reasoning, it "would have to pile inference upon inference" to find a substantial commercial effect, and such reasoning would convert Congress's commerce authority to a general police power.[92] Because all four factors weighed against the GFSZA, the Court found that gun possession in a school zone did not substantially affect interstate commerce.[93]

Five years after *Lopez*, in *United States v. Morrison*, the Supreme Court considered a provision of the Violence Against Women Act (VAWA).[94] The provision at issue provided federal civil remedies to victims of violent, gender-motivated crimes.[95] Congress explicitly relied on the Commerce Clause as the source of federal authority in enacting the

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[84] *Id.* at 562–63.

[85] *Id.* at 563.

[86] *Id.*

[87] *Id.* at 563–64.

[88] *Id.* at 564.

[89] *Id.*

[90] *Id.*

[91] *Id.*

[92] *Id.* at 567.

[93] *Id.* at 561–64, 567.

[94] United States v. Morrison, 529 U.S. 598, 601 (2000).

[95] *Id.* at 601–02. The remedies available under this provision included "the recovery of compensatory and punitive damages, injunctive and declaratory relief, and such other relief as a court may deem appropriate." *Id.* at 605.

civil remedy provision.[96] The Court, however, determined that the provision exceeded Congress's commerce authority.[97]

As in *Lopez*, the Court focused solely on the "substantial effects" category.[98] The Court proceeded to consider the four *Lopez* factors and applied them to the VAWA's civil remedy provision.[99]

First, the Court determined that gender-motivated, violent crimes were "not, in any sense of the phrase, economic activity."[100] Next, the Court stressed that, like the GFSZA in *Lopez*, the VAWA's civil remedy provision did not contain a jurisdictional element.[101]

The Court then considered whether the VAWA was supported by congressional findings.[102] Unlike *Lopez*, the VAWA was supported by numerous congressional findings linking gender-motivated violence to interstate commerce.[103] However, the Court determined that the presence of such findings, alone, was not enough to sustain the Act.[104] The Court stressed that whether an activity substantially affects commerce is a question for the Court.[105] The findings were deemed "substantially weakened" because they relied on the same "method of reasoning" that the Court rejected as too attenuated in *Lopez*.[106]

Again, the Court feared that the Government's interpretation would convert Congress's commerce authority into a general police power.[107] Stressing the noneconomic nature of violent, gender-motivated crimes and its attenuated relationship to interstate commerce, the Court held that the

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[96] *Id.* at 607. Congress also cited Section 5 of the Fourteenth Amendment as a source of federal authority. However, the Court determined that Congress's power under the Fourteenth Amendment did not extend to the enactment of the civil remedy provision. *Id.* at 627.

[97] *Id.* at 619.

[98] *Id.* at 609.

[99] *Id.* at 610–15.

[100] *Id.* at 613.

[101] *Id.*

[102] *Id.* at 614.

[103] *Id.*

[104] *Id.*

[105] *Id.*

[106] *Id.* at 615. These findings indicated "that gender-motivated violence affect[ed] interstate commerce 'by deterring potential victims from traveling interstate'" and engaging in interstate business, "'by diminishing national productivity, increasing medical and other costs, and decreasing the supply of and the demand for interstate products.'" *Id.* (quoting H.R. REP. NO. 103-711, at 385 (1993)).

[107] *See id.*

VAWA's civil remedy provision exceeded the scope of Congress's commerce authority.[108]

Lopez and *Morrison* had major implications concerning the Court's Commerce Clause jurisprudence.[109] When considered together, *Lopez* and *Morrison* created considerable uncertainty regarding Congress's Commerce Clause power.[110] As a result, the decisions "opened a door to constitutional challenges that appeared to have been closed almost 60 years ago."[111] Following the uncertainty created by this "federalism revolution,"[112] parties began to challenge numerous federal statutes for allegedly exceeding Congress's commerce authority.[113] The ESA, "the *bête noir* of property rights activists, states' rights enthusiasts, and the neo-conservative crowd,"[114] became the target of such challenges when it was applied to purely intrastate species.[115]

D. ESA Challenges Under the Lopez and Morrison Framework

The circuit courts have failed to identify consistently a particular object of the regulation that need be "economic" with respect to challenging the ESA under the Commerce Clause.[116] The courts have generally taken three approaches to such cases.[117] The first approach, termed the "conduct approach,"[118] considers the human conduct that results in the taking.[119] Under the conduct approach, a court will find a commercial effect if the human conduct is commercial in nature.[120] The second approach, the "individual target approach,"[121] considers the

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[108] *Id.* at 617.

[109] *See* CHEMERINSKY, *supra* note 60, at 272–73.

[110] Lee Pollack, *The "New" Commerce Clause: Does Section 9 of the ESA Pass Constitutional Muster After* Gonzales v. Raich*?*, 15 N.Y.U. ENVTL. L.J. 205, 218 (2007).

[111] CHEMERINSKY, *supra* note 60, at 273.

[112] Pollack, *supra* note 110, at 218.

[113] *Id.* at 220.

[114] Blumm & Kimbrell, *supra* note 57, at 310.

[115] Pollack, *supra* note 110, at 220.

[116] David W. Scopp, Comment, *Commerce Clause Challenges to the Endangered Species Act: The Rehnquist Court's Web of Confusion Traps More Than the Fly*, 39 U.S.F. L. REV. 789, 803 (2005).

[117] Blumm & Kimbrell, *supra* note 57, at 346–47.

[118] Scopp, *supra* note 116, at 803.

[119] *Id.* *See, e.g.*, Gibbs v. Babbitt, 214 F.3d 483, 495 (4th Cir. 2000) (finding a commercial effect where landowners killed red wolves to protect livestock).

[120] *See Gibbs*, 214 F.3d at 495.

[121] Scopp, *supra* note 116, at 804.

economic impact of the individual species at issue.[122] Under this approach, courts look only to the individual species to find a commercial impact.[123] The third approach, the "comprehensive approach,"[124] considers the comprehensive nature of the ESA.[125] When applying this approach, a court considers the economic effect of takings on all endangered species.[126] Under the comprehensive approach, every facet of a regulation need not be economic; rather, it is enough if the regulation at issue is "an essential part of a larger regulation of economic activity, in which the regulatory scheme could be undercut unless the intrastate activity were regulated."[127] The comprehensive approach also includes the "biodiversity defense."[128] This defense focuses on the commercial effect of protecting biodiversity.[129]

1. The D.C. Circuit Adopts the Biodiversity Defense

In *National Ass'n of Homebuilders v. Babbitt*, the D.C. Circuit applied the biodiversity defense to uphold the ESA.[130] The case arose after it was determined that the construction of a hospital and intersection would result in takings of the Dehli Sands Flower Loving Fly.[131] The two judges composing the majority agreed that the loss of biodiversity had a substantial effect on commerce, but they disagreed as to why.[132]

Judge Wald found a substantial effect by considering the effect that all endangered species have on interstate commerce.[133] She concluded that

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[122] *Id.* *See, e.g.*, *Gibbs*, 214 F.3d at 493 (finding a commercial impact where red wolves were an integral part of a multi-million dollar tourism industry).

[123] *See Gibbs*, 214 F.3d at 492.

[124] *See* Scopp, *supra* note 116, at 804.

[125] Blumm & Kimbrell, *supra* note 57, at 347.

[126] *See, e.g.*, GDF Realty Invs., Ltd. v. Norton, 326 F.3d 622, 639 (5th Cir. 2003).

[127] United States v. Lopez, 514 U.S. 549, 561 (1995).

[128] Blumm & Kimbrell, *supra* note 57, at 347.

[129] *See, e.g.*, Nat'l Ass'n of Homebuilders v. Babbitt, 130 F.3d 1041, 1047 (D.C. Cir. 1997).

[130] *See id.* (upholding the ESA as a "regulation of the use of the channels of interstate commerce.").

[131] *Id.* at 1045.

[132] *Id.* at 1057. Judge Wald was also willing to uphold the ESA as a proper exercise over the channels of commerce. *Id.* at 1046–49. Judge Wald offered two justifications for this theory: First, the prohibition was necessary to aid the ESA's prohibition on transporting and selling endangered species in interstate commerce. *Id.* at 1046. Second, the prohibition fell under Congress's authority to prevent the channels of interstate commerce from being used for "immoral and injurious" purposes. *Id.*

[133] *Id.* at 1052–54.

endangered plants and animals are "a natural resource that commercial actors can use to produce marketable products."[134] Additionally, Judge Wald determined that extinctions would deprive the economy of future, unknown uses of these species.[135]

In a concurring opinion, Judge Henderson expressly rejected Judge Wald's reliance on future, unknown uses because Judge Henderson regarded such uses as too uncertain.[136] Rather, she found "the loss of biodiversity itself has a substantial effect . . . on interstate commerce."[137] Judge Henderson concluded that due to "the interconnectedness of species and ecosystems, it is reasonable to conclude that the extinction of one species affects others and their ecosystems and that the protection of a purely intrastate species (like the Dehli Sands Flower-Loving Fly) will therefore substantially affect land and objects that are involved in interstate commerce."[138]

Thus, the D.C. Circuit upheld the ESA due to the commercial impacts of protecting biodiversity.[139] However, even in this case the two judges disagreed as to why such protections had a commercial impact.[140]

2. *The Fourth Circuit Adopts All Three Approaches*

Gibbs v. Babbitt[141] concerned the red wolf, an endangered species due to loss of habitat and hunting.[142] The suit arose when a group of plaintiffs sought a declaration that the anti-take regulation, as applied to red wolves on private property in North Carolina, exceeded Congress's commerce power.[143] In upholding the ESA, the Fourth Circuit applied the conduct approach,[144] the individual target approach,[145] and the comprehensive

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[134] *Id.* at 1052.
[135] *Id.* at 1053.
[136] *Id.* at 1058 (Henderson, J., concurring).
[137] *Id.* (Henderson, J., concurring).
[138] *Id.* at 1059 (Henderson, J., concurring).
[139] *Id.* at 1043.
[140] *Compare id.* at 1052–53 (emphasizing potential future uses of endangered species), *with id.* at 1057–59 (Henderson, J., concurring) (rejecting the potential future uses argument and relying instead on the loss of biodiversity itself).
[141] 214 F.3d 483 (4th Cir. 2000).
[142] *Id.* at 488.
[143] *Id.* at 489.
[144] *See id.* at 495.
[145] *See id.* at 493.

approach.[146]

Under the conduct approach, the court stressed that takings of red wolves were economically motivated because the animals were being killed to defend livestock.[147] Thus, the court found a connection to interstate commerce by considering plaintiffs' commercial motivation.[148]

In applying the individual target approach, the court considered the aggregate economic impact of red wolves.[149] The court reasoned that the species' recovery could contribute to tourism, scientific research, and a renewed trade in pelts.[150]

Finally, the court relied on the comprehensive approach.[151] In applying this standard, the Fourth Circuit found that the ESA had clear connections to commerce and that the regulation at issue was an integral part of the ESA.[152] The court stressed that the commercial effect "must be viewed not from the taking of one wolf, but from the potential commercial differential between an extinct and a recovered species."[153] Accordingly, the Fourth Circuit upheld the ESA after considering all three approaches.

3. The Fifth Circuit Applies the Comprehensive Approach

In *GDF Realty Investments, Ltd. v. Norton*,[154] the Fifth Circuit upheld the ESA as applied to six invertebrate cave species that are found only in two counties in Texas.[155] In doing so, the court expressly rejected the conduct approach.[156] The court also considered the individual target approach but found that the commercial impact of the cave species was

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[146] *See id.* at 497.

[147] *Id.* at 495.

[148] *Id.*

[149] *Id.* at 493.

[150] *Id.* at 492–95. The court placed heavy emphasis on a study that found that wolf-related tourism could contribute up to $500 million dollars to the surrounding area. *Id.* at 493–94. This is in sharp contrast to the other ESA challenges where the species at issue had no such direct economic impact. *See, e.g.*, Rancho Viejo, LLC v. Norton, 323 F.3d 1062, 1067 (D.C. Cir. 2003).

[151] *Gibbs*, 214 F.3d at 497.

[152] *Id.* at 497–98.

[153] *Id.* at 497.

[154] 326 F.3d 622 (5th Cir. 2003).

[155] *Id.* at 624.

[156] *Id.* at 636 (holding that the lower court "erred in looking primarily" at the commercial motivations of the plaintiffs).

significantly less than that of red wolves in *Gibbs*.[157] However, the court finally determined that the ESA could be upheld under the comprehensive approach.[158]

In applying this standard, the court reasoned that it was appropriate to aggregate the commercial effects of all endangered species because the ESA was a larger regulation directed at economic activity.[159] The court found such a commercial impact because the ESA protected the value of the genetic heritage of endangered species and because most takings would result from economic activities.[160] Having noted that the ESA was directed at economic activity, the court found that the take provision was an essential part of that larger economic regulatory scheme.[161] The court also determined the take provision was essential because the regulatory scheme would be undercut if particular takes were allowed to escape regulation, thereby "lead[ing] to piece-meal extinctions."[162] As a result, the court upheld the ESA under the comprehensive scheme approach.[163]

4. The D.C. Circuit Applies the Conduct Approach

In *Rancho Viejo, LLC v. Norton*,[164] the D.C. Circuit considered its second Commerce Clause challenge to the ESA.[165] The case arose after the Fish and Wildlife Service determined that the plaintiff's plans to construct a housing development would result in takings of the arroyo southwestern toad.[166] The court applied the conduct approach to uphold the ESA.[167] The court stressed that the plaintiff's planned commercial development was the regulated activity, and this development had a

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[157] *See id.* at 636–37.

[158] *Id.* at 638–41.

[159] *Id.* at 639.

[160] *Id.*

[161] *Id.* at 639–40.

[162] *Id.* at 640.

[163] *Id.* at 640–41. In his concurring opinion, Judge Dennis expressly joined the Fifth Circuit's opinion but further elaborated on the comprehensive scheme framework applied by the court. *See id.* at 641–44. Additionally, Judge Dennis stressed that the take prohibition was "necessary and proper" to the ESA's comprehensive scheme. *Id.* This sentiment would later be bolstered by Justice Scalia's concurrence in *Gonzales v. Raich*, 545 U.S. 1, 33–42 (2005) (Scalia, J., concurring).

[164] 323 F.3d 1062 (D.C. Cir. 2003).

[165] *See id.* at 1064.

[166] *Id.* at 1065–66.

[167] *See id.* at 1068.

"plainly commercial character."[168] In stressing its point, the court instructed that "[t]he ESA does not purport to tell toads what they may or may not do. Rather, . . . [the ESA] appl[ies] to the persons who do the taking, not to the species that are taken."[169] Thus, the court upheld the ESA under the conduct approach; however, the decision was clearly at odds with the Fifth Circuit's decision in *GDF Realty*.[170]

The preceding cases demonstrate the reluctance of the circuit courts to strike down the ESA. However, the circuits could not agree on a single framework for analyzing the cases. As a result, several decisions were clearly at odds with one another. These differing views did not go unnoticed by commentators,[171] nor did these differing views go unnoticed by the circuit judges.[172]

III. RECENT DEVELOPMENTS

A. The Supreme Court Applies the Comprehensive Approach

In *Gonzales v. Raich*,[173] the Supreme Court considered a Commerce Clause challenge to the Controlled Substances Act (CSA).[174] The case concerned California's Compassionate Use Act (CUA), which permits the possession and cultivation of marijuana for medicinal purposes.[175] The California statute is contrary to the federal CSA, which makes it a criminal offense to manufacture, distribute, or possess marijuana.[176] This suit arose after federal agents seized and destroyed the plaintiffs' cannabis plants.[177] The plaintiffs argued that the CSA's prohibition of marijuana, as applied to the intrastate manufacture and possession for personal medicinal purposes,

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[168] *Id.* at 1072.

[169] *Id.*

[170] *See* GDF Realty Invs., Ltd. v. Norton, 326 F.3d 622 (5th Cir. 2003). The Fifth Circuit expressly held that a plaintiff's "commercial motivations" are not the proper scope of inquiry. *Id.* at 636.

[171] *See, e.g.*, Blumm & Kimbrell, *supra* note 57; Scopp, *supra* note 116.

[172] *See, e.g.*, Rancho Viejo, LLC v. Norton, 334 F.3d 1158, 1160 (D.C. Cir. 2003) (Roberts, J., dissenting from denial of rehearing en banc). Chief Justice Roberts, then a judge on the D.C. Circuit, dissented, pointing out the inconsistency between *GDF Realty* and *Rancho Viejo* and indicating that the approach applied in *Rancho Viejo* was inconsistent with the Supreme Court's decisions in *Lopez* and *Morrison*. *Id.*

[173] 545 U.S. 1 (2005).

[174] *Id.* at 7–8.

[175] *Id.* at 6. California voters approved the CUA, by popular vote, in 1996. *Id.* at 5.

[176] *Id.* at 14–15.

[177] *Id.* at 7.

exceeded Congress's Commerce Clause authority.[178]

In rejecting this claim, the Court focused entirely on whether marijuana, grown only for personal, medicinal use, had a substantial effect on interstate commerce.[179] The Court reiterated that when "'a general regulatory statute bears a substantial relation to commerce, the *de minimis* character of individual instances arising under that statute is of no consequence.'"[180] Relying on *Wickard v. Filburn*,[181] the Court concluded that Congress could regulate purely intrastate, noncommercial activity if it found that a failure to regulate that activity would undercut the larger regulation of the interstate market.[182] Further, it is not necessary to determine if that intrastate activity, taken in the aggregate, substantially affects interstate commerce; rather, the Court must only determine if Congress had a rational basis for so concluding.[183]

In applying this standard, the Court found that the CSA was "a comprehensive framework for regulating the production, distribution, and possession" of controlled substances.[184] Marijuana was one of many substances classified as a controlled substance, and that classification was merely one of many "'essential part[s] of a larger regulation of economic activity . . . .'"[185] Moreover, Congress could rationally conclude that the failure to regulate the intrastate manufacture and possession of marijuana could undermine the CSA's prohibition.[186] Accordingly, the Court "refuse[d] to excise individual components of that larger scheme" and upheld the CSA.[187]

In his concurring opinion, Justice Scalia stressed that Congress's authority to regulate intrastate, noncommercial activities is derived from the Necessary and Proper Clause.[188] "Where necessary to make a regulation of interstate commerce effective," he concluded, Congress has the authority to regulate intrastate activities that do not have a substantial

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[178] *Id.* at 15.

[179] *Id.* at 17.

[180] *Id.* (quoting United States v. Lopez, 514 U.S. 549, 558 (1995)).

[181] 317 U.S. 111 (1942) (upholding federal limits on wheat production as applied to wheat grown solely for personal use).

[182] *Raich*, 545 U.S. at 18.

[183] *Id.* at 22 (citing *Lopez*, 514 U.S. at 557).

[184] *Id.* at 24.

[185] *Id.* (quoting *Lopez*, 514 U.S. at 561).

[186] *Id.* at 15.

[187] *Id.* at 22.

[188] *Id.* at 34 (Scalia, J., concurring).

effect on interstate commerce.[189] Justice Scalia then identified two instances in which it may be necessary and proper for Congress to regulate intrastate activities.[190] First, Congress has authority to establish "rules for the governance of commerce between States."[191] Second, Congress can facilitate commerce by eliminating obstructions to commerce, or it may restrict commerce by eliminating potential stimulants to commerce.[192] Although this second principle has limits,[193] Justice Scalia determined that "where Congress has the authority to enact a regulation of interstate commerce, 'it possesses every power needed to make that regulation effective.'"[194]

In applying this standard, Justice Scalia easily concluded that Congress has authority to extinguish a market in controlled substances.[195] Since Congress possesses this power, it also could regulate intrastate activities, whether economic or noneconomic, because it is an appropriate means of achieving the legitimate goals of eradicating controlled substances.[196]

B. Commerce Clause Challenges to the ESA After Raich

In *Raich*, the Supreme Court applied the comprehensive approach to the CSA[197] just as the Fifth Circuit applied it to the ESA.[198] Following the Supreme Court's decision, several commentators argued *Raich* validated the ESA's take provision.[199] However, the Supreme Court's ruling did not put an end to Commerce Clause challenges to the ESA.[200]

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[189] *Id.* at 35 (Scalia, J., concurring).

[190] *Id.* (Scalia, J., concurring).

[191] *Id.* (Scalia, J., concurring).

[192] *Id.* (Scalia, J., concurring).

[193] Justice Scalia stressed that Congress cannot "pile inference upon inference" to find a substantial effect. *Id.* at 35–36 (quoting United States v. Lopez, 514 U.S. 549, 557 (1995)).

[194] *Id.* at 36 (Scalia, J., concurring) (quoting United States v. Wrightwood Dairy Co., 315 U.S. 110, 118–19 (1942)).

[195] *Id.* at 39–40 (Scalia, J., concurring).

[196] *Id.* at 40 (Scalia, J., concurring).

[197] *See id.* at 15–22 (majority opinion).

[198] *See* GDF Realty Invs., Ltd. v. Norton, 326 F.3d 622, 636–40 (5th Cir. 2003).

[199] *See* Michael C. Blumm & George A. Kimbrell, Gonzalez v. Raich*, the "Comprehensive Scheme" Principle, and the Constitutionality of the Endangered Species Act*, 35 ENVTL. L. 491, 496 (2005); Bradford C. Mank, *After* Gonzales v. Raich*: Is the Endangered Species Act Constitutional Under the Commerce Clause?*, U. COLO. L. REV. 375, 375–76 (2007).

[200] *See, e.g.*, San Luis & Delta-Mendota Water Auth. v. Salazar, 638 F.3d 1163 (9th Cir. 2011); Ala.-Tombigbee Rivers Coal. v. Kempthorne, 477 F.3d 1250, 1253 (11th Cir. 2007).

1. *Alabama-Tombigbee Rivers Coalition v. Kempthorne*

In *Alabama-Tombigbee Rivers Coalition v. Kempthorne*, the Eleventh Circuit considered a Commerce Clause challenge regarding the Alabama sturgeon.[201] In upholding the ESA, the court relied extensively on the comprehensive approach enunciated in *Raich*.[202]

The court first noted that the ESA is a general regulatory statute that has a substantial effect on commerce.[203] The court reached this determination because the ESA prohibits commerce in endangered species, a billion dollar industry in the United States.[204] Additionally, the value of endangered species also includes the "incalculable value" of genetic diversity, which is essential to medicine, agriculture, aquaculture, and recreational outdoor activities.[205]

The court next considered whether the listing process was essential to the ESA.[206] The court had little trouble in answering in the affirmative.[207] The court stressed that "[t]he decision to list a species as endangered or threatened is a necessary precondition to the protections afforded species under the Act."[208] Therefore, the court found that the listing process was essential to the ESA's regulatory scheme.[209]

Finally, the court concluded that Congress could rationally believe that it was necessary to protect purely intrastate, noncommercial species.[210] Accordingly, the Eleventh Circuit upheld the ESA under the comprehensive approach.[211]

2. *San Luis & Delta-Mendota Water Authority v. Salazar*

The Ninth Circuit most recently heard a Commerce Clause challenge to the ESA in *San Luis & Delta-Mendota Water Authority v. Salazar*.[212]

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[201] 477 F.3d at 1253–54.

[202] *See id.* at 1273–74.

[203] *Id.* at 1273. Interestingly, the Coalition did not argue to the contrary. *Id.*

[204] *Id.*

[205] *Id.* at 1273–74.

[206] *Id.* at 1274–76. The other ESA Commerce Clause cases focused on the ESA's take prohibition. However, the issue remains the same: whether the individual component, a take or the listing process, is essential to the regulatory scheme.

[207] *Id.* at 1274.

[208] *Id.*

[209] *Id.*

[210] *Id.* at 1277.

[211] *See id.*

[212] 638 F.3d 1163 (11th Cir. 2011).

The case arose after a group of almond, pistachio, and walnut growers experienced reduced water deliveries to their farms as a result of listing the delta smelt as endangered.[213] The Ninth Circuit, relying heavily on *Raich* and *Alabama-Tombigbee*, had little difficulty upholding the ESA.[214]

In applying the comprehensive approach, the court found the ESA implicates economic concerns because species become endangered due to over harvesting for commercial purposes.[215] Also, the ESA prohibits commerce in endangered or threatened species, and the ESA helps preserve the future, unanticipated value of species.[216] Additionally, the court found the ESA promotes both the recovery of species for future commercial uses and interstate travel to observe and study endangered species.[217] Finally, the court found the ESA protects genetic diversity, which improves agriculture and aquaculture.[218] Having so concluded, the court upheld the ESA against this most recent attack.[219]

In both *Alabama-Tombigbee* and *Delta-Mendota*, the courts faithfully applied *Raich*'s comprehensive rationale.[220] Both courts seem to have assumed that it was proper to consider the aggregate effect of all endangered species.[221] However, it is not clear that such aggregation is appropriate under *Raich*.[222]

IV. ANALYSIS

In *Raich*, the Supreme Court affirmed the comprehensive approach as a principle of its Commerce Clause jurisprudence.[223] However, there is a stark contrast between *Raich* and the ESA Commerce Clause cases. In *Raich*, the Court considered only regulating marijuana.[224] Indeed, the

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[213] *Id.* at 1168. "The delta smelt is a small fish, 60–70 millimeters in length, that is undisputedly endemic to California." *Id.* at 1167.

[214] *See id.* at 1174–77.

[215] *Id.* at 1176.

[216] *Id.*

[217] *Id.*

[218] *Id.*

[219] *Id.* at 1177.

[220] *See id.* at 1177; Ala.-Tombigbee Rivers Coal. v. Kempthorne, 477 F.3d 1250, 1276–77 (11th Cir. 2007).

[221] *See Delta-Mendota*, 638 F.3d at 1176; *Alabama-Tombigbee*, 477 F.3d at 1273.

[222] *See* Gonzales v. Raich, 545 U.S. 1, 33 (2005) (considering only the economic impact of marijuana rather than all drugs listed under the CSA).

[223] *See id.* at 22.

[224] *Id.* at 33.

Court did not consider the effect of all drugs listed under the CSA.[225] However, in the ESA context, courts have found it appropriate to consider the aggregate effect on all endangered species.[226] This approach ignores the fact that many endangered species have little, if any, current commercial value.[227] This aggregation approach is further undermined by the fact that approximately half of all endangered species are found only in one state.[228] These distinguishing features have led some to conclude that the Supreme Court would be unlikely to uphold the ESA under such an approach.[229]

The other approaches applied by the circuit courts also have shortcomings. Under the individual target approach, the ESA is valid only if the individual species at issue have a substantial effect on commerce.[230] While this approach would be sufficient to cover some species, such as the red wolf,[231] it would leave others without ESA protection.[232] Similarly, under the conduct approach, some species may be denied protection where the taker does not have commercial motivations.[233]

Fortunately, there is an alternative approach: the ecosystem approach.[234] Under the ecosystem approach, a court would consider

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[225] *See* Amicus Curiae Brief of the National Federation of Independent Business, Small Business Legal Center in Support of Plaintiffs-Appellants Stewart & Jasper Orchards and Reversal of the District Court's Order at 9, San Luis & Delta-Mandota Water Auth. v. Salazar, 638 F.3d 1163 (11th Cir. 2011) (No. 10-15192), 2010 WL 6191816.

[226] *See, e.g.*, GDF Realty Invs., Ltd. v. Norton, 326 F.3d 622, 639 (5th Cir. 2003).

[227] *See* John Copeland Nagle, *The Commerce Clause Meets the Dehli Sands Flower-Loving Fly*, 97 MICH. L. REV. 174, 186 (1998).

[228] Nat'l Ass'n of Homebuilders v. Babbitt, 130 F.3d 1041, 1052 (D.C. Cir. 1997).

[229] *See* Scott Schwartz, Note, *The Hapless Ecosystem: A Federalist Argument in Favor of an Ecosystem Approach to the Endangered Species Act*, 95 VA. L. REV. 1325, 1331 (2009).

[230] *See, e.g.*, Gibbs v. Babbitt, 214 F.3d 483, 492–95 (4th Cir. 2000).

[231] *See id.*

[232] *See* Blumm & Kimbrell, *supra* note 57, at 347.

[233] *See* Rancho Viejo, LLC v. Norton, 323 F.3d 1062, 1080 (D.C. Cir. 2003) (Ginsburg, C.J., concurring) (reasoning that the conduct approach would not extend to "the lone hiker in the woods, or the homeowner who moves dirt in order to landscape his property").

[234] *See* Nagle, *supra* note 227, at 186–87. In his article, Professor Nagle argues against the ecosystem approach. *Id.* *See also* Schwartz, *supra* note 229, at 1326. In his article, Schwartz agrees that the ecosystem approach is consistent with the Supreme Court's Commerce Clause jurisprudence. *Id.* However, he argues that the ESA, as implemented, focuses only on protecting individual species rather than ecosystems. *Id.* Further, he argues that courts are incapable of assigning an ecosystem focus to the ESA. *Id.* at 1334.
(*continued*)

whether the particular ecosystem upon which a species depends has a substantial effect on commerce.[235] This section first explains why the ecosystem is a proper scope of judicial inquiry.[236] It then demonstrates how the ecosystem approach fits within *Raich*'s comprehensive rationale.[237]

A. Ecosystems Are a Proper Scope of Judicial Inquiry

To determine whether the ESA is a valid exercise of congressional authority, it is necessary to first determine what the ESA regulates. To make this determination, one must first look to the plain language of the statute.[238] No further inquiry is necessary if that language is unambiguous.[239] However, if the language is ambiguous, a court may look beyond the statutory language in order to determine Congress's intent.[240] In the ESA context, both the statute's plain language and legislative history support the view that ecosystems are the proper object of economic regulation.[241] This view is further bolstered by the Supreme Court's interpretation of the ESA.[242]

1. The ESA's Plain Language Supports the Ecosystem Approach

When interpreting a statute, one must first determine if the language has a plain and unambiguous meaning.[243] To make this determination, it is necessary to consider "the language itself, the specific context in which that language is used, and the broader context of the statute as a whole."[244]

Such a shift in the focus, he argues, "would simply be a sham to avoid judicial review." *Id.* at 1352–53. Accordingly, Schwartz calls upon Congress to amend the ESA to focus on ecosystems. *Id.* at 1326. However, this argument ignores the ESA's text and legislative history and the Supreme Court's interpretation of the ESA, all of which indicate that the statute focuses on ecosystems. *See infra* Part IV.A. It also ignores the judiciary's reluctance to strike federal laws "except upon a clear showing of unconstitutionality." Salazar v Buono, 130 S. Ct. 1803, 1820 (2010). Such a showing is not present when one considers the text, legislative history, and interpretation of the ESA. *See infra* Part IV.A.

[235] *See* Nagle, *supra* note 227, at 187–88.

[236] *See* discussion *infra* Part IV.A.

[237] *See* discussion *infra* Part IV.B.

[238] Robinson v. Shell Oil Co., 519 U.S. 337, 340 (1997).

[239] *Id.*

[240] *See* United States v. Gonzales, 520 U.S. 1, 6 (1997).

[241] *See* discussion *infra* Part IV.A.1–2.

[242] *See* discussion *infra* Part IV.A.3.

[243] *Robinson*, 519 U.S. at 340.

[244] *Id.* at 341.

In considering the language itself, the ESA is rather clear. The ESA explicitly states that one of its purposes is "to provide a means whereby the *ecosystems* upon which endangered species . . . depend may be conserved."[245] This language seems to allow only one meaning: that the ESA is designed to conserve those ecosystems upon which endangered species depend. Thus, the plain language of the statute supports the view that ecosystems are the proper object of the ESA to be evaluated with respect to Commerce Clause implications.

It may be argued that the language is ambiguous because the term "ecosystem" is not defined in the ESA. However, where a term is not defined, it is to be given its ordinary meaning.[246] The term "ecosystem" is ordinarily defined as: "[A] biological community of interacting organisms and their physical environment."[247] Thus, the plain language indicates that the ESA is designed to conserve the entire community of organisms and the environment upon which endangered species depend. The plain language seems to provide no other meaning.

This unambiguity is further bolstered when one considers "the specific context in which [the] language is used."[248] The specific language at issue is included in the ESA's "Purposes" section.[249] The first purpose is to conserve the ecosystems upon which endangered species depend.[250] The second purpose is "to provide a program for the conservation of such endangered species . . . ."[251] Finally, the ESA was designed "to achieve the purposes of the treaties and conventions" to which the United States is a signatory.[252]

When considered in this context, it becomes apparent that the first purpose, to conserve ecosystems, is significantly broader than the second purpose. The second purpose focuses only upon those species that are endangered, while the first purpose focuses on the broader community upon which those species depend. To read the first purpose as applying

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[245] 16 U.S.C. § 1531(b) (2006) (emphasis added).

[246] United States v. Santos, 553 U.S. 507, 511 (2008) (citing Asgrow Seed Co. v. Winterboer, 513 U.S. 179, 187 (1995)).

[247] CONCISE OXFORD ENGLISH DICTIONARY 454 (Angus Stevenson & Maurice Waite eds., 12th ed. 2011).

[248] *Robinson*, 519 U.S. at 341.

[249] *See* 16 U.S.C. § 1531(b).

[250] *Id.*

[251] *Id.*

[252] *Id.* The United States pledged itself to several treaties designed to conserve fish, wildlife, and plants. *See* 16 U.S.C. § 1531(a).

only to those species that are endangered, rather than the broader community, would make the first two purposes repetitive. Thus, one of those purposes would be rendered meaningless, thereby violating a court's "duty 'to give effect . . . to every clause and word of a statute.'"[253] When read properly, each purpose maintains an independent meaning.

This view is strengthened when the "broader context" of the ESA is considered.[254] First, in determining which species are endangered, the Secretary is required to consider several factors.[255] One factor to be considered is "the present or threatened destruction, modification, or curtailment of" a species's habitat.[256] The term "habitat" is undefined and therefore should be given its ordinary meaning.[257] "Habitat" generally means: "[T]he natural home or environment of an organism."[258] Under this definition, a habitat is merely part of the larger ecosystem. Therefore, by considering threats to habitat, the Secretary also, by necessity, considers the ecosystems upon which endangered species depend.

Additionally, section 5 of the ESA authorizes the Secretary to acquire land in order to conserve species.[259] Furthermore, section 7 of the ESA requires federal agencies to ensure that none of their activities will "result in the destruction or adverse modification of" a species's critical habitat.[260] Again, these provisions indicate Congress's intent to provide broader protection to endangered species by conserving the ecosystems upon which those species depend.

Finally, the ESA defines the term "conserve" to include "the use of all methods and procedures which are necessary to bring any endangered

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[253] Duncan v. Walker, 533 U.S. 167, 174 (2001) (quoting United States v. Menasche, 348 U.S. 528, 538–39 (1955)).

[254] Robinson v. Shell Oil Co., 519 U.S. 337, 341 (1997).

[255] 16 U.S.C. § 1533(a)(1).

[256] *Id.* § 1533(a)(1)(A).

[257] *See* United States v. Santos, 553 U.S. 507, 511 (2008).

[258] CONCISE OXFORD ENGLISH DICTIONARY 246 (Angus Stevenson & Maurice Waite eds., 12th ed. 2011).

[259] 16 U.S.C. § 1534(a).

[260] *Id.* § 1536(a)(2). The term "critical habitat" is defined to mean "the specific areas within the geographical area occupied by the species, at the time it is listed" if those areas are "(I) essential to the conservation of the species and (II) . . . may require special management considerations or protection." *Id.* § 1532(5)(A)(i). The term also includes "specific areas outside the geographic area occupied by the species at the time it is listed . . . [if] such areas are essential for the conservation of the species." *Id.* § 1532(5)(A)(ii).

species . . . to the point" where ESA protections "are no longer necessary."[261] This indicates that the ESA is designed to return endangered species to their natural state where human protection is no longer needed for their survival. To achieve such a goal, it is necessary to establish healthy ecosystems in which such species can survive.

The plain language of the ESA, and the context in which that language is used, supports the view that the statute was adopted to conserve ecosystems. Further, when considered as a whole, a broad purpose is found in the ESA. This broad purpose includes conserving individual species. However, this purpose extends beyond individual species. After all, if Congress only intended to preserve an individual species, it could have simply provided authority for a captive breeding program in order to maintain the suspect species. Rather, the ESA provides a mechanism not only to conserve species but also to preserve them in a natural state. This natural state requires the conservation of ecosystems, and in enacting the ESA, Congress unambiguously provided a framework for conserving those ecosystems.

2. *Legislative History Supports the Ecosystem Approach*

It appears that the ESA unambiguously provides a mechanism to conserve ecosystems. However, even if a court were to conclude otherwise, the legislative history of the ESA provides further support to the ecosystem approach.

Congress recognized that "the principal threat to animals stems from the destruction of their habitat."[262] The legislative history makes it overwhelmingly clear that Congress intended to expand prior endangered species legislation in order to tackle this problem.[263] A primary area of concern was the federal government's inability to acquire suitable habitat for endangered species.[264] To achieve this goal, Congress lifted prior statutory ceilings on funds for such acquisitions.[265] This focus on habitat protection emphasizes Congress's attempt to provide a wider protection in endangered species legislation. It also, by necessity, provides for

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[261] *Id.* § 1532(3).

[262] STAFF OF S. COMM. ON ENVIRONMENT AND PUBLIC WORKS, 97TH CONG., LEGIS. HISTORY OF THE ENDANGERED SPECIES ACT OF 1973, AS AMENDED IN 1976, 1977, 1978, 1979, AND 1980 192 (Comm. Print 1982) [hereinafter LEGISLATIVE HISTORY].

[263] *See, e.g.*, *id.* at 193, 201, 357; S. REP. NO. 93-307, at 3 (1973); H.R. REP. NO 93-412, at 1 (1973).

[264] *See* LEGISLATIVE HISTORY, *supra* note 262, at 472.

[265] *See* S. REP. NO. 93-307, at 3.

ecosystem conservation. Recognizing this, Congress expressly provided for ecosystem conservation in the ESA.[266]

Congress also recognized that all species "provide[] a service to the environment and represent[] a part of an immensely complicated ecological system."[267] Congress acknowledged that these systems were immensely complex and not well understood.[268] However, it also realized that allowing any species to go extinct would "tamper with the health of the structure itself."[269] Acknowledging this, Congress acted to conserve not only individual species but also to preserve a "balance of nature."[270] This balance demonstrates itself in "the critical nature of the interrelationships of plants and animals between themselves and with their environment."[271] To protect these complex relationships, Congress made it "[t]he basic purpose of the [ESA]" to provide a mechanism for conserving ecosystems.[272]

By speaking in such broad terms, Congress made clear that the ESA was not designed solely to provide protections to individual species. Rather, Congress was also concerned with preserving a "balance of nature."[273] To achieve this goal, Congress explicitly provided in the ESA that ecosystems are to be conserved.[274]

3. The Supreme Court's Interpretation of the ESA Supports the Ecosystem Approach

In *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*,[275] the Supreme Court considered an administrative rule regarding the ESA's take prohibition.[276] The ESA prohibits takes of endangered species;[277] it defines the term "take" to include the term "harm."[278] Acting pursuant to granted authority, the Secretary of the Interior promulgated a

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[266] *See* 16 U.S.C. § 1531(b).
[267] LEGISLATIVE HISTORY, *supra* note 262, at 471.
[268] *See id.* at 356.
[269] *Id.* at 357.
[270] S. REP. NO. 93-307, at 2.
[271] H.R. REP. NO 93-412, at 6 (1973).
[272] *Id.*
[273] *See* S. REP. NO. 93-907, at 2; LEGISLATIVE HISTORY, *supra* note 262, at 203, 374.
[274] *See* 16 U.S.C. § 1531(b) (2006).
[275] 515 U.S. 687 (1995).
[276] *Id.* at 690.
[277] 16 U.S.C. § 1538(a)(1)(B).
[278] *Id.* § 1532(19).

regulation defining the term "harm" to "include significant *habitat modification or degradation* where it actually kills or injures wildlife by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering."[279] In *Sweet Home*, the critical issue was whether Congress intended the term "take" to include habitat modification.[280]

The Court upheld the regulation as a reasonable interpretation of the ESA on three separate grounds, two of which are relevant to the present discussion.[281] First, the Court concluded that the term "harm" naturally included habitat modification.[282] In doing so, the Court rejected a claim that "harm" required an application of direct force.[283]

The Court's second reason is likely the most important for present purposes. The Court relied on "the broad purpose of the ESA."[284] Habitat modification, the Court concluded, is "the precise harm[] Congress enacted the statute to avoid."[285] The Court reached this conclusion because "among [the ESA's] central purposes is 'to provide a means whereby the ecosystems upon which endangered species . . . depend may be conserved . . . .'"[286] From holding this view, it becomes apparent that the Supreme Court viewed the ESA as a broad regulation that provides a framework for conserving ecosystems.[287]

Thus, the ecosystem approach is supported by the ESA's plain language, the legislative history concerning the ESA, and the Supreme Court's interpretation of the ESA.[288] Accordingly, courts should apply the ecosystem approach in future ESA Commerce Clause cases.

B. The Ecosystem Approach Fits Within Raich's *Comprehensive Rationale*

Having determined that ecosystems are a proper scope for judicial inquiry, it is now necessary to consider whether the ESA fits within the comprehensive rationale enunciated in *Raich*. *Raich* established that

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[279] 50 C.F.R. § 17.3(c)(3) (2011) (emphasis added).

[280] 515 U.S. at 693.

[281] *Id.* at 697–98. The third ground the Court relied on stressed that the ESA's incidental take provision indicated that the term "take" was intended to include indirect takes. *Id.* at 700–01.

[282] *Id.* at 697.

[283] *Id.* at 697–98.

[284] *Id.* at 698.

[285] *Id.*

[286] *Id.* (quoting 16 U.S.C. § 1531(b) (2006)).

[287] *See id.* (citing Tenn. Valley Auth. v. Hill, 437 U.S. 153, 180 (1978)).

[288] *See supra* Part IV.A.1–3.

Congress has the authority to regulate intrastate, noncommercial activities if those activities are part of a larger scheme that has a substantial effect on interstate commerce.[289] Essentially, *Raich* established a two-part test for this analysis.[290] First, the regulation must be part of a general regulatory statute that bears a substantial relation to commerce.[291] Second, the regulation at issue must be an essential part of that larger scheme.[292] The ESA, when considered under the ecosystem approach, fits squarely within the *Raich* framework.

1. The ESA Is a General Regulatory Statute that Bears a Substantial Relation to Commerce

Raich reaffirmed Congress's authority to regulate intrastate, noneconomic activities if those activities undermine "'a general regulatory statute [that] bears a substantial relation to commerce.'"[293] Thus, the first issue in analyzing this first prong is whether the ESA is a general regulatory statute.[294] If so, the question becomes whether the ESA bears a substantial relation to commerce.[295]

In determining whether a statute is a general regulatory statute, a court considers whether it is comprehensive in nature.[296] In the context of the ESA, this does not seem to be at issue. On multiple occasions, the Supreme Court called the ESA "the most comprehensive legislation for the preservation of endangered species ever enacted by any nation."[297] Further, the ESA's challengers even acknowledged that the ESA is comprehensive in nature, though they dispute that the ESA contains the relevant commercial nexus.[298] Thus, there can be no doubt that the ESA is a general regulatory statute.

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[289] 545 U.S. 1, 17–18 (2005).

[290] *See id.*

[291] *See id.* at 17.

[292] *See id.* at 18.

[293] *Id.* at 17 (quoting United States v. Lopez, 514 U.S. 549, 558 (1995)).

[294] *See id.*

[295] *See id.*

[296] *See id.* at 24.

[297] Tenn. Valley Auth. v. Hill, 437 U.S. 153, 180 (1978). The Supreme Court later quoted this classification of the ESA in Babbitt v. Sweet Home Chapter of Cmtys. for a Great Or., 515 U.S. 687, 698 (1995).

[298] *See* Plaintiffs-Appellants' Reply Brief at 33, San Luis & Delta-Mendota Water Auth. v. Salazar, 638 F.3d 1163 (9th Cir. 2011) (No. 10-15192), 2010 WL 6191823 [hereinafter Plaintiffs' Reply Brief].

Having concluded that the ESA is a general regulatory statute, it is necessary to determine whether the ESA bears a substantial relation to commerce.[299] A regulation bears a substantial relation to commerce if it is "quintessentially economic."[300] To define "economics," the Supreme Court referred to *Webster's Third New International Dictionary*: "'[T]he production, distribution, and consumption of commodities.'"[301] Notably, however, the Court did not state that economics is concerned *solely* with the production, distribution, and consumption of commodities.[302] Indeed, "economics" has also been defined as "the production, distribution, and consumption of goods and *services*."[303] Today, the United States is largely a "service economy."[304] Services make up 68% of the American gross domestic product.[305] With such a large portion of the American economy devoted to services, it is unlikely that Congress's Commerce Clause power extends only to regulating commodities. Rather, it seems that a regulation is quintessentially economic if it relates to the production, distribution, and consumption of commodities, goods, or services. Thus, the ESA is quintessentially economic, and therefore bears a substantial relation to commerce, if it can be established that ecosystems bear a substantial relation to the production, distribution, or consumption of commodities or services.[306]

Such a relationship can be found in ecosystem services. "Ecosystem services" are defined as "the conditions and processes through which natural ecosystems, and the species that make them up, sustain and fulfill human life."[307] These services produce commercial goods, such as food, timber, fuel, and pharmaceuticals.[308] While these individual components

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[299] *See Raich*, 545 U.S. at 17.

[300] *Id.* at 25.

[301] *Id.* at 25–26 (quoting WEBSTER'S THIRD NEW INTERNATIONAL DICTIONARY 720 (1966)).

[302] *See id.* It seems that the Court focused on commodities because a commodity—marijuana—was at issue. *See id.* at 14.

[303] MERRIAM-WEBSTER'S COLLEGIATE DICTIONARY 365 (2002) (emphasis added).

[304] BRADLEY R. SCHILLER, ESSENTIALS OF ECONOMICS 42 (3d ed. 1999).

[305] *Services*, OFF. U.S. TRADE REPRESENTATIVE, http://www.ustr.gov/trade-topics/services-investment/services (last visited Dec. 19, 2012).

[306] *See Raich*, 545 U.S. at 25–26.

[307] Gretchen C. Daily, *Introduction: What Are Ecosystem Services?*, *in* NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS 1, 3 (Gretchen C. Daily ed., 1997).

[308] *Id.*

are clearly commercial, the ecosystem services themselves often have a significant impact on commerce.[309] These services include climate and atmosphere regulation, proliferation and restoration of fresh water, pollination, and the formation and enrichment of soil.[310]

Ecosystem services are essential for modern human civilization; however, their value, which often goes unnoticed, is extremely difficult to quantify.[311] Nonetheless, these services have direct economic impacts. In 1997, a team of experts attempted to calculate the total value of all ecosystem services in the world; they estimated that value as being between $16 trillion and $54 trillion.[312] This was at a time when the gross national product of the entire world was $18 trillion.[313] Ecosystems provide real economic benefits to the public; however, it is difficult to measure the value of ecosystem services, and efforts to quantify their exact economic impacts are imprecise.[314] This Comment now considers several of these services in order to further, and more fully, demonstrate the commercial effects of ecosystem services.

a. Ecosystems Regulate the Hydrological Cycle

Intact ecosystems play a significant role in regulating the hydrological cycle.[315] This is especially true of wetlands.[316] Wetlands are essential to the maintenance of clean water.[317] Rather than permit nutrients to travel directly into coastal areas, healthy wetlands absorb these nutrients.[318] At the same time, wetlands extract pollutants from water before that water

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[309] *See id.*

[310] *See* WILSON, *supra* note 4, at 106; Jerry Melillo & Osvaldo Sala, *Ecosystem Services*, *in* SUSTAINING LIFE: HOW HUMAN HEALTH DEPENDS ON BIODIVERSITY 75, 76 (Eric Chivian & Aaron Bernstein eds., 2008).

[311] Daily, *supra* note 307, at 7–8.

[312] MELINA F. LAVERTY ET AL., BIODIVERSITY 101, at 68–69 (2008).

[313] WILSON, *supra* note 4, at 106.

[314] Lawrence H. Goulder & Donald Kennedy, *Valuing Ecosystem Services: Philosophical Bases and Empirical Methods*, *in* NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS 23, 42–43 (Gretchen C. Daily ed., 1997).

[315] *See* U.S. DEP'T OF AGRIC., VALUING ECOSYSTEM SERVICES (Feb. 2007), http://www.fs.fed.us/ecosystemservices/pdf/ecosystem-services.pdf.

[316] *See* LAVERTY ET AL., *supra* note 312, at 72–73.

[317] *Id.* at 72.

[318] *Id.* at 72–73. When these nutrients are not removed, they contribute to the formation of "dead zones" where nothing can live. *Id.* at 72. The largest dead zone, in the Gulf of Mexico near the Mississippi River delta, covers nearly 8,000 square miles. *Id.*

passes to other aquatic systems.[319] Additionally, wetlands provide protection from hurricanes.[320] This storm protection service has been annually valued at $23.3 billion in the United States.[321]

Ecosystems also play a significant role in reducing and preventing floods.[322] Vegetation plays a key role in transferring water back into the atmosphere.[323] When land is cleared of vegetation, it increases surface runoff and local flooding.[324] Additionally, extensive deforestation can contribute to extreme flooding in distant locations.[325]

The services provided by ecosystems are essential for human society.[326] Every day people undertake actions to perform these very same services. For example, humans operate water treatment plants to produce clean water.[327] Likewise, intact wetlands also produce clean water, albeit in a different manner.[328] Humans also build dams and levees to prevent flooding.[329] When humans directly engage in these activities, there is no doubt that they are engaged in economic behavior. Namely, humans engage in economic behavior by producing services for human consumption. Intact ecosystems achieve this same result.[330] There is, therefore, no reason to view an ecosystem as anything other than what it truly is: a producer of an economic service.[331] Of course, the production of services is "quintessentially economic."[332]

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[319] *Id.* at 72–73.

[320] ROMAN, *supra* note 27, at 79.

[321] *Id.*

[322] *See* Gretchen C. Daily, Pamela A. Matson & Peter M. Vitousek, *Ecosystem Services Supplied by Soil*, *in* NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS 113, 117 (Gretchen C. Daily ed., 1997).

[323] *Id.* at 118.

[324] *Id.*

[325] *Id.*

[326] *Id.*

[327] *See* Melillo & Sala, *supra* note 310, at 102.

[328] *See id.* at 84–85. Interestingly, in recent years, humans have acknowledged this important service provided by wetlands, and they have resorted to constructing wetlands to reap this benefit. *See id.*

[329] *See id.* at 89, 113.

[330] *See id.* at 75.

[331] *See id.*

[332] *See* Gonzales v. Raich, 545 U.S. 1, 25 (2005).

b. Ecosystems Contribute to Pollination

Pollination is essential to most agricultural crops.[333] Both wild and managed animals pollinate these crops.[334] Managed honeybees are a significant source of pollination in the United States.[335] However, creatures other than honeybees are also pollinators.[336] The value of these non-honeybee species has been estimated to be between $4.1 billion and $6.1 billion annually in the United States.[337] The total value of all pollinators in the United States has been valued at $40 billion annually.[338] All of these animals, whether they are wild or managed, rely on ecosystems for foraging and nesting.[339] Of course, those that are wild are provided courtesy of an intact ecosystem.[340]

Again, this is a significant service, here pollination and ultimately the world's food supply, being supplied by both humans and ecosystems. No matter which way this service is produced, it is economic in nature. The only difference is the manner in which the service is being produced.

c. Ecosystems Contribute to Pest Control

Agricultural pests, including insects, plant pathogens, and weeds, annually destroy approximately 37% of all crops in the United States.[341] These losses would be significantly higher without natural predators, found in ecosystems, to keep pests under control.[342] Natural predators "maintain the stability of agricultural systems worldwide and are crucial for food security."[343] The loss of these services can result in millions of dollars

[333] LAVERTY ET AL., *supra* note 312, at 75.

[334] *See* Gary Paul Nabhan & Stephen L. Buchmann, *Services Provided by Pollinators*, *in* NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS 133, 133 (Gretchen C. Daily ed., 1997).

[335] *See* LAVERTY ET AL., *supra* note 312, at 75.

[336] *See* Nahban & Buchmann, *supra* note 334, at 139. These creatures include both vertebrate and invertebrate species. *Id.* at 138–39.

[337] *Id.* at 141.

[338] ROMAN, *supra* note 27, at 79–80.

[339] Nabhan & Buchmann, *supra* note 334, at 133.

[340] *See* Melillo & Sala, *supra* note 310, at 101–02.

[341] LAVERTY ET AL., *supra* note 312, at 77.

[342] *Id.*

[343] Rosamond L. Naylor & Paul R. Ehrlich, *Natural Pest Control Services and Agriculture*, *in* NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS 151, 151 (Gretchen C. Daily ed., 1997).

worth of damage to crops in a single year.[344]

Of course, farmers do not rely exclusively on ecosystem services to combat pests.[345] In the United States, farmers spent $21 billion annually on pesticides in the mid-1990s.[346] However, pesticides are not as effective as natural services because pests develop resistance to pesticides.[347] It is unrealistic to assume that humans are capable of replacing this service provided by ecosystems.[348] Valuations estimate pest control to cost between $54 billion and $1 trillion.[349]

Once again, this is another example of a distinct service that is supplied by ecosystems. This service is critical to human existence because the world's food supply is dependent upon it.[350] Further, it would be impossible for humans alone to provide this service.[351] The economic benefits provided by this service are clear.

d. Ecosystems Preserve a Genetic Library

Natural ecosystems generate and maintain biodiversity.[352] This biodiversity has not been studied extensively, with less than one percent of the nearly two million known species studied in depth.[353] Nonetheless, those species that have been studied have provided genetic resources that are vital to modern agriculture, medicine, and industry.[354] Congress was expressly concerned with preserving these genetic resources for both present and future uses when it enacted the ESA.[355]

When determining the value of a good, economists consider the good's

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[344] *Id.* at 162.

[345] *Id.*

[346] *Id.*

[347] LAVERTY ET AL., *supra* note 312, at 77. Numerous species are known to have developed resistance to chemicals designed to eradicate them. *See* Naylor & Ehrlich, *supra* note 343, at 153. They include more than 500 species of insects and mites, more than 100 species of weeds, and around 150 species of plant pathogens. *Id.*

[348] *See* Naylor & Ehrlich, *supra* note 343, at 166 (indicating that in the absence of natural controls, crop production would likely be impossible).

[349] *Id.* at 167.

[350] *Id.* at 151.

[351] *See id.* at 166.

[352] Norman Myers, *Biodiversity's Genetic Library*, *in* NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS 255, 255 (Gretchen C. Daily ed., 1997).

[353] WILSON, *supra* note 4, at 113–14.

[354] Myers, *supra* note 352, at 255.

[355] *See* H.R. REP. NO. 93-412, at 4–5 (1973).

current use value and its potential future use value, which is called an option value.[356] Thus, both measurements of value have a firm basis in economics and are useful in determining the value of the genetic library.[357] Agriculture provides a good example of these values.

Agriculture has exploited the genetic library in the past and continues to do so in the present.[358] This exploitation will certainly be continued in the future.[359] About 100 of the 250,000 known plant species provide almost entirely the world's food supply.[360] Of these 100 species, twenty "carry most of the load," with three of these (wheat, corn, and rice) being the most important.[361] However, humans have consumed 30,000 wild plant species throughout history, and 10,000 of these species can still be domesticated today or in the future.[362] Thus, these species represent a significant option value to agriculture.[363]

This value has been significantly used in the past.[364] In the 1970s, a leaf fungus blighted the corn crop in the United States.[365] The blight affected corn from the Great Lakes to the Gulf of Mexico.[366] The crops were highly susceptible to the disease because they had been inbred from only six lines of ancestors.[367] The blight caused more than $2 billion in damage.[368] However, a blight-resistant germoplasm derived from a wild Mexican relative of corn, among other things, halted the damage.[369]

Genetic materials have played similar roles for other crops, such as rice and wheat.[370] Perhaps the most famous example involves the

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[356] Alan Randall, *What Mainstream Economists Have to Say About the Value of Biodiversity*, *in* BIODIVERSITY 217, 219 (E.O. Wilson ed., 1988).

[357] *See id.*

[358] *See generally* Myers, *supra* note 352, at 255–71 (discussing past and present uses of the genetic library in agriculture).

[359] *See id.* at 271.

[360] WILSON, *supra* note 4, at 114.

[361] *Id.*

[362] *Id.*

[363] *See id.*

[364] *See* Myers, *supra* note 352, at 258.

[365] *Id.*

[366] *Id.*

[367] *See id.*

[368] *Id.*

[369] *See id.*; LAVERTY ET AL., *supra* note 312, at 73.

[370] *See* Myers, *supra* note 352, at 257–59.

potato.[371] The Irish potato famine, responsible for one million deaths, resulted because European potatoes were not genetically diverse, which rendered the potatoes highly susceptible to disease.[372] After a major blight affected the European crop, a search ensued to find a relative that was resistant to the blight.[373] Hybridizing the European crop with a related Mexican plant produced a disease-resistant potato.[374] These examples illustrate the direct value that a diverse genetic library has had on agriculture in the past; this value is still being exploited today.[375]

In recent years, genetic engineering, derived from the revolution in molecular genetics,[376] benefitted agriculture significantly.[377] "[A]ll species of organisms—are potential donors of genes that can be transferred by genetic engineering into crop species in order to improve their performance."[378] By isolating the proper genes and then inserting them into the DNA of crops, new variants are formed that are resistant to cold or pests.[379] Others may grow faster or be more nutritious.[380] Already, several crops—including corn, cotton, and potatoes—have been genetically engineered to manufacture a toxin that kills pests.[381] Others have been genetically engineered to resist herbicides and to produce beta-carotene.[382] The genes to be inserted can come from any organism; for example, the genes from a jellyfish have been inserted into a plant.[383]

These procedures have clear commercial benefits, and they are possible only because natural ecosystems provide people with a diverse genetic library. Indeed, "[t]he best biotechnologist is no better than the basic materials he or she has to work with."[384] The examples above relate only to agriculture; however, the value of the genetic library extends to

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[371] LAVERTY ET AL., *supra* note 312, at 73.
[372] *Id.* at 73–74.
[373] *Id.* at 74.
[374] *Id.*
[375] *See* WILSON, *supra* note 4, at 114.
[376] *Id.*
[377] *See* Myers, *supra* note 352, at 269.
[378] WILSON, *supra* note 4, at 114.
[379] *Id.*
[380] *Id.*
[381] *Id.* at 114–15.
[382] *Id.* at 115.
[383] *Id.*
[384] Myers, *supra* note 352, at 269.

other areas, such as healthcare and industrial products.[385] Ecosystems exclusively provide this library.[386]

e. Summary

The previously-discussed examples illustrate just a small portion of the services that natural ecosystems provide.[387] Other services that ecosystems provide include cleaning air, modifying climate, and cycling nutrients.[388] The services described "'bear[] a substantial relation to commerce'"[389] as they relate directly to the production of goods and services.[390] In several instances, humans attempt to produce these services. However, humans only assist in providing these services because humans lack the economic and physical capacity to provide them on their own.[391] In this sense, it is appropriate to view ecosystems as economic entities that produce services for human consumption.[392] The production of a service, in this case ecosystem services, fits squarely within the definition of "economics" adopted by the Supreme Court and opponents of the ESA.[393]

Many ecosystem services are essential to human existence.[394] Without ecosystems, humans would be left to attempt to provide these services by themselves.[395] In providing a comprehensive framework for preserving ecosystems, the ESA simply opts to allow natural ecosystems to produce

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[385] *See generally id.* at 263–68.

[386] *Id.* at 255.

[387] *See* Melillo & Sala, *supra* note 310, at 76 (discussing numerous additional ecosystem services).

[388] *See id.*

[389] Gonzales v. Raich, 545 U.S. 1, 17 (2005) (quoting United States v. Lopez, 514 U.S. 549, 558 (1995)).

[390] *See id.* at 25–26.

[391] WILSON, *supra* note 4, at 106.

[392] This is not to say that natural ecosystems possess no other value. Certainly, there are aesthetic and intrinsic values in nature, and they may well outweigh any economic benefits received from ecosystem services. *See id.* at 128–29. However, the Constitution does not provide Congress the authority to adopt laws for such purposes. *See* U.S. CONST. art. I, § 8 (granting the powers vested to Congress by the Constitution). For this reason, it is important to acknowledge the economic services provided by natural ecosystems.

[393] *See Raich*, 545 U.S. at 25 (defining "economics" as "the production, distribution, and consumption of commodities."); Plaintiffs' Reply Brief, *supra* note 298, at 27 (reciting *Raich*'s definition of "economics").

[394] *See* Daily, *supra* note 307, at 3.

[395] *See* Daily, Matson & Vitousek, *supra* note 322, at 118.

these services.[396] Indeed, the production of collective goods and services is "[o]ne of the most important areas in which the government is involved in the economy . . . ."[397] Accordingly, the ESA merely regulates the production of economic services, thus rendering the ESA "'a general regulatory statute that bears a substantial relation to commerce . . . .'"[398]

2. *The Take Provision Is an Essential Part of the Larger Regulatory Scheme*

The second *Raich* requirement is that the regulation at issue must be an essential part of the larger regulatory scheme.[399] A regulation is deemed essential if the "failure to regulate that class of activity would undercut" the larger scheme.[400] However, determining whether the regulatory scheme will be undercut is subject to deferential rational basis review.[401] Therefore, it is not necessary to determine whether the regulated activities "substantially affect interstate commerce in fact, but only whether a 'rational basis' exists for so concluding."[402]

In the ESA context, the regulation at issue is the take provision, particularly the take of intrastate species with no known commercial value.[403] The issue, then, is whether Congress could rationally conclude that it is necessary to prohibit takes of intrastate, noncommercial species to conserve ecosystems.[404] The ESA meets this standard.

It is commonly accepted by ecologists that a diverse ecosystem is more productive and stable.[405] A diverse ecosystem is better able to respond to and recover from natural disturbances such as fire, heavy rains, or drought.[406] Scientists have long recognized that biodiversity affects

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[396] *See* 16 U.S.C. § 1531(b) (2006).

[397] ALLEN W. SMITH, DEMYSTIFYING ECONOMICS: THE BOOK THAT MAKES ECONOMICS ACCESSIBLE TO EVERYONE 36 (3d ed. 2008).

[398] *Raich*, 545 U.S. at 17 (quoting United States v. Lopez, 514 U.S. 549, 558 (1995)).

[399] *See id.* at 18.

[400] *Id.*

[401] *See id.* at 22.

[402] *Id.* (citing United States v. Lopez, 514 U.S. 549, 557 (1995)).

[403] *See, e.g.*, GDF Realty Invs., Ltd. v. Norton, 326 F.3d 622, 625–26 (5th Cir. 2003).

[404] *See Raich*, 545 U.S. at 22.

[405] WILSON, *supra* note 4, at 108.

[406] *See id.* at 108–09. *See also* David Tilman, *Biodiversity and Ecosystem Functioning*, *in* NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS 93, 104, 109 (Gretchen C. Daily ed., 1997).

ecosystem functions.[407] Indeed, Charles Darwin recognized this concept more than a century ago.[408] Since Darwin, the concept has been expanded upon, and it is now widely accepted that biodiversity is essential to maintaining functioning ecosystems.[409]

Biodiversity is also essential for maintaining ecosystem services.[410] Indeed, maintaining ecosystem services may be "the most important anthropocentric reason for preserving diversity."[411] However, it is not well understood "what species are necessary for the[] services to work, or in what numbers and proportions they must be present."[412] In the face of such uncertainty, Congress could rationally conclude that it is necessary to prevent takes of all species, even if those species are purely intrastate and noncommercial. Aldo Leopold once wrote:

> The last word in ignorance is the man who says of an animal or plant: 'What good is it?' If the land mechanism as a whole is good, then every part is good, whether we understand it or not. If the biota, in the course of aeons, has built something we like but do not understand, then who but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering.[413]

Congress could rationally, and wisely, heed this advice.

Thus, the ESA's take provision, when analyzed under the ecosystem approach, satisfies both requirements of the comprehensive rationale announced in *Raich*.

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[407] Tilman, *supra* note 406, at 94.

[408] *See id.*

[409] *See id.* at 94, 109.

[410] Harold A. Mooney & Paul R. Ehrlich, *Ecosystem Services: A Fragmentary History*, *in* NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS 11, 16 (Gretchen C. Daily ed., 1997).

[411] Paul R. Ehrlich, *The Loss of Diversity: Causes and Consequences*, *in* BIODIVERSITY 21, 21 (E.O. Wilson ed., 1988).

[412] Melillo & Sala, *supra* note 310, at 75–76.

[413] ALDO LEOPOLD, *The Round River*, *in* A SAND COUNTY ALMANAC: WITH ESSAYS ON CONSERVATION FROM ROUND RIVER 188, 190 (Ballantine Books 1970) (1953).

C. Criticisms of the Ecosystem Approach

Professor John Nagle challenges the ecosystem approach on two grounds.[414] First, he argues that the individual species must play a key role in its ecosystem.[415] Second, he argues that the specific ecosystem in which the species resides must contribute to interstate commerce.[416] Professor Nagle maintains that the ecosystem approach works only if both of these requirements are met.[417] Despite the value of such criticisms, they are not fatal to the ecosystem approach.

Professor Nagle first argues that the individual species must "play[] a key role in its ecosystem . . . ."[418] He maintains that the ecosystem approach "relies upon the ecological truism that the loss of any individual species affects the ecosystem of which it is part."[419] This reliance is unwarranted, he claims, because it exaggerates the indispensability of species within an ecosystem.[420] He points out that species go extinct all of the time.[421] Further, many species were long believed to be extinct at the time of their listing.[422] The disappearance, or believed disappearance, of such species has been neither catastrophic nor has it caused noticeably adverse consequences on interstate commerce or the functioning of ecosystems.[423] Professor Nagle therefore concludes that "[i]t is hard to imagine how a species that has a minor effect on the functioning of its ecosystem nonetheless exerts a substantial effect on interstate commerce."[424]

The flaw in this argument is that it looks to the individual species to find a substantial effect on interstate commerce.[425] However, the commercial nexus can be established by considering the comprehensive nature of the ESA itself.[426] Once the commercial nexus is established, Congress can regulate intrastate, noncommercial activity if it concludes

[414] *See* Nagle, *supra* note 227, at 186–88.
[415] *Id.* at 186–87.
[416] *Id.* at 187–88.
[417] *Id.* at 188.
[418] *Id.* at 187.
[419] *Id.* at 186.
[420] *Id.* at 186–87.
[421] *Id.* at 187.
[422] *Id.*
[423] *Id.*
[424] *Id.*
[425] *See id.*
[426] *See* Gonzales v. Raich, 545 U.S. 1, 17 (2005).

that the failure to do so would undermine the larger regulatory scheme.[427] In making this determination, the relevant question is not whether the intrastate, noncommercial activity "substantially affect[s] interstate commerce in fact, but only whether a 'rational basis' exists for so concluding."[428]

In the ESA context, the commercial nexus is established by considering the commercial impacts of ecosystems on interstate commerce.[429] The intrastate, noncommercial activity is the taking of species that reside in only one state and possess no known commercial value.[430] Thus, the ESA protects such species if Congress reasonably believes that the failure to protect these species "would leave a gaping hole in the" ESA.[431] Accordingly, under the ecosystem approach, it is not necessary that a species play a key role in its ecosystem in fact.[432] Rather, the question is only whether Congress could rationally conclude that the preservation of ecosystems requires protecting all species within an ecosystem.[433] Such a rational basis exists.

Scientists do not yet fully understand the role that biodiversity plays in ecosystem functioning.[434] Although this knowledge is incomplete, "the ability of ecosystems to provide a sustainable flow of goods and services to humans is likely to be highly dependent on biodiversity."[435] Additionally, biodiversity contributes to the stability, functioning, and sustainability of ecosystems.[436] Furthermore, scientists do not know which species are necessary to maintain ecosystems.[437]

To illustrate this point, Edward O. Wilson proposed the following thought experiment:

> If we were to dismantle an ecosystem gradually, removing one species after another, the exact consequences at each

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[427] *Id.*

[428] *Id.* at 22 (citing United States v. Lopez, 514 U.S. 549, 557 (1995)).

[429] *See supra* Part IV.B.1.

[430] *See, e.g.*, Rancho Viejo, LLC v. Norton, 323 F.3d 1062, 1065 (D.C. Cir. 2003).

[431] *See Raich*, 545 U.S. at 22.

[432] *See id.*

[433] *See id.*

[434] Gretchen C. Daily, *Valuing and Safeguarding Earth's Life-Support Systems*, *in* NATURE'S SERVICES: SOCIETAL DEPENDENCE ON NATURAL ECOSYSTEMS 365, 366 (Gretchen C. Daily ed., 1997).

[435] Tilman, *supra* note 406, at 94.

[436] *Id.* at 109.

[437] EDWARD O. WILSON, THE DIVERSITY OF LIFE 309 (1992).

> step would be impossible to predict, but one general result seems certain: at some point the ecosystem would suffer a collapse. Most communities of organisms are held together by redundancies in the system. In many cases two or more ecologically similar species live in the same area, and any one can fill the niches of others extinguished, more or less. But inevitably the resiliency would be sapped, efficiency of the food webs would drop, nutrient flow would decline, and eventually one of the elements deleted would prove to be a keystone species. Its extinction would bring down other species with it, possibly so extensively as to alter the physical structure of the habitat itself.[438]

The problem is that the identities of most keystone species are unknown, and they can range in size from the largest mammals to the smallest insects.[439] In the face of such uncertainties, Congress could rationally conclude that it is necessary to protect all species within an ecosystem, even absent a showing that an individual species in fact plays a key role in its ecosystem.

The second criticism of the ecosystem approach focuses on the economic contribution of the ecosystem itself.[440] Professor Nagle argues that the ecosystem approach works only if the isolated ecosystem contributes to interstate commerce.[441] It is likely, he claims, that an isolated ecosystem will not provide such a contribution.[442]

This argument, however, suffers a major flaw. It overstates the ease with which such an ecosystem can be found. Humans use, in one way or another, every ecosystem on Earth.[443] Humanity's existence depends on functioning ecosystems.[444] The range of services provided by these ecosystems is broad, and these services are provided, in some form, from

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[438] *Id.*

[439] *Id.*

[440] *See* Nagle, *supra* note 227, at 187.

[441] *Id.* at 187–88.

[442] *Id.* at 187.

[443] John Terborgh & James A. Estes, *Conclusion: Our Trophically Degraded Planet*, *in* TROPHIC CASCADES: PREDATORS, PREY, AND THE CHANGING DYNAMICS OF NATURE 353, 367 (John Terborgh & James A. Estes eds., 2010).

[444] *Id.*

essentially all types of ecosystems.[445] Thus, challengers of the ESA will face a heavy burden to establish that an isolated ecosystem contributes in no way to an ecosystem service of some variety.

This criticism, however, perhaps highlights the greatest strength of the ecosystem approach. The Supreme Court's Commerce Clause jurisprudence requires that there be "a logical stopping point to" Congress's commerce power.[446] Indeed, in *Lopez*, the Court found it "difficult to perceive any limitation on federal power" under the theories advanced by the government.[447] The ecosystem approach supplies such a limitation by requiring that an ecosystem contribute to an ecosystem service. It may be difficult, perhaps impossible, to identify such an ecosystem that does not contribute to a service.[448] However, this does not create "a general federal police power . . . ."[449] Rather, it merely underscores the quintessentially economic nature of ecosystems and the services that they provide.

Thus despite the value of Professor Nagle's criticisms, they are not fatal to the ecosystem approach. The first criticism looks to the individual species to find a commercial nexus.[450] This, however, ignores *Raich*'s affirmation of the comprehensive principle. The second criticism claims that many ecosystems do not contribute to commerce.[451] Though this argument may be valid, it overstates the ease with which such an ecosystem can be found, and it ignores the vast array of services that ecosystems provide. Thus, neither criticism is sufficient to undermine the ecosystem approach.

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[445] *See* Robert Costanza et al., *The Value of the World's Ecosystem Services and Natural Capital*, 387 NATURE 253, 253–54, 256 (1997), http://www.esd.ornl.gov/benefits_conference/nature_paper.pdf.

[446] Rancho Viejo, LLC v. Norton, 323 F.3d 1062, 1080 (D.C. Cir. 2003) (Ginsburg, C.J., concurring).

[447] United States v. Lopez, 514 U.S. 549, 564 (1995).

[448] *See* Terborgh & Estes, *supra* note 443, at 367; Costanza et al., *supra* note 445, at 254, 256.

[449] *Lopez*, 514 U.S. at 564.

[450] *See* Nagle, *supra* note 227, at 186–88.

[451] *See id.* at 187–88.

V. CONCLUSION

On Easter Sunday in 1722, European explorers stumbled onto a remote Pacific island more than 2,000 miles from the South American coast.[452] They found a wasteland.[453] The plant life consisted of grasses, with no trees or shrubs more than ten feet tall, and the largest native animals were insects.[454] Some 2,000 native inhabitants, unaware that other people existed, had resorted to living in caves for protection from their enemies.[455] The most conspicuous features on the island were the some 200 massive stone heads that dotted the landscape.[456] These statues, weighing up to eighty-two tons, had been transported from quarries six miles away.[457] For centuries, researchers speculated how such a small society, devoid of resources for making tools, could build and transport these massive sculptures.[458] However, in the 1990s, modern science helped reveal the true story of Easter Island.[459]

Modern research revealed that Easter Island was once the home of a subtropical forest filled with large trees, shrubs, herbs, ferns, and grasses.[460] These forests supported a broad range of life, most notably some thirty species of birds.[461] Thus, rather than a lifeless wasteland, Easter Island was once a subtropical paradise.[462] This paradise supported a powerful society capable of producing the famous statues.[463] However, as this society multiplied, the island's resources began to wane.[464] After five

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[452] Jared Diamond, *Easter's End*, DISCOVER, Aug. 1995, at 63–64, *available at* http://discovermagazine.com/1995/aug/eastersend543.

[453] *Id.* at 64.

[454] *Id.*

[455] *Id.* at 64, 68.

[456] *Id.* at 64.

[457] *Id.*

[458] *Id.* Some researchers claimed the statues were built by extraterrestrial visitors. *Id.* at 64–65. Others, perhaps reflecting the racial bias of the day, believed they were constructed by American Indians who arrived on the island enlightened by contact with European societies. *Id.* at 64.

[459] *See id.* at 63–69.

[460] *Id.* at 67.

[461] *Id.*

[462] *See id.*

[463] *Id.* at 68.

[464] *Id.*

centuries of human habitation, the plant diversity had begun to decrease.[465] A few centuries later, the once great forests had completely vanished.[466] When Europeans arrived, about 250 years later, they found a wasteland.[467] The surviving natives had resorted to cannibalism and hiding in caves to survive.[468] A once great society destroyed the very ecosystem upon which its survival depended, and as a result, that society collapsed in civil war.[469]

Easter Island's story is not merely a study in history; it is also a warning.[470] Today, the human population is quickly expanding as Earth's resources are constantly shrinking.[471] Easter Island is merely "Earth writ small."[472] Like the inhabitants of Easter Island, modern human civilization is intricately tied to the health of those ecosystems that support human existence.[473]

Congress, recognizing this importance, adopted the ESA in order to conserve ecosystems. However, the circuit courts have repeatedly ignored the broad commands of the ESA. In considering Commerce Clause challenges to the ESA, the circuit courts have inconsistently identified the particular object of the regulation that need be economic. The courts have reached decisions that are entirely at odds with one another.[474] In reaching these inconsistent results, the circuit courts have failed to consider "the broad purpose of the ESA . . . ."[475] Having a broad purpose implies that the ESA was designed to provide a comprehensive framework for conserving those ecosystems upon which endangered species depend for their survival. Thus, when one acknowledges this broad purpose, it becomes clear that ecosystems are the proper scope of judicial inquiry when considering Commerce Clause challenges to the ESA.

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[465] *See* GEOFFREY HEAL, NATURE AND THE MARKETPLACE: CAPTURING THE VALUE OF ECOSYSTEM SERVICES 15 (2000).

[466] *Id.*

[467] Diamond, *supra* note 452, at 64.

[468] *Id.* at 68.

[469] HEAL, *supra* note 465, at 14–15.

[470] *See* Diamond, *supra* note 452, at 68.

[471] *Id.*

[472] *Id.*

[473] *See* HEAL, *supra* note 465, at 17.

[474] *Compare* Rancho Viejo, LLC v. Norton, 323 F.3d 1062, 1072 (D.C. Cir. 2003) (holding that plaintiff's commercial conduct was sufficient to find a substantial commercial effect), *with* GDF Realty Invs., Ltd. v. Norton, 326 F.3d 622, 636 (5th Cir. 2003) (holding that the lower court erred in primarily considering plaintiffs' commercial conduct).

[475] Babbitt v. Sweet Home Chapter of Cmtys. for a Great Or., 515 U.S. 687, 698 (1995).

Having determined that ecosystems are the proper scope of inquiry, it is necessary to determine if the ESA fits within *Raich*'s comprehensive rationale. The ESA satisfies this test. The ESA is "'the most comprehensive legislation for the preservation of endangered species ever enacted by any nation.'"[476] Further, the ESA is "quintessentially economic" in that it relates to the production of services.[477] These ecosystem services are directly produced by the ecosystems the ESA is designed to protect. Therefore, the ESA is a general regulatory statute bearing a substantial relation to commerce.

Finally, ecosystems are complex mechanisms that require biodiversity to function properly. Because these complex mechanisms are not completely understood, Congress could rationally conclude that it is necessary to conserve all species. It is rational to conserve even species confined to a single state and that have no independent commercial effect. Thus, when considered in its proper context, the ESA meets *Raich*'s two-part test and therefore stands on firm constitutional ground.

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[476] *Sweet Home*, 515 U.S. at 698 (quoting Tenn. Valley Auth. v. Hill, 437 U.S. 153, 180 (1978)).

[477] *See* Gonzales v. Raich, 545 U.S. 1, 25–26 (2005).